

REMARKS

Claims 1-20 remain in the case. Claims 4-5, 7-8, 14, 18-20 have been amended.

Claims 4-5, 7, 14, 18, and 20 have been objected to due to formalities. Claims 4-5, 7, 14, 18, and 20 are amended in accordance with the suggestions of the examiner. Therefore, the objection to claims 4-5, 7, 14, 18, and 20 should be withdrawn.

The rejection of claims 1-4, 7-11, 13-15, and 17-19 under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Patent No. 6,542,128) in view of Wang et al. (U.S. Patent No. 5,589,842) respectfully traversed.

Claims 1 and 13 each recite, in part, a transmission line having first and second conductors, the first conductor being coupled to a feed point on the lineal antenna trace and the second conductor being coupled to both the ground plane and a second point on the lineal antenna trace spaced from the feed point. (emphasis added).

Wang (Fig. 3) shows a single co-axial cable (a first transmission line) being input into a RF hybrid unit and outputting two co-axial cables (two transmission lines) 36 and 37 which carry signals to the antenna elements 21. Each transmission line includes central shielded electric cables and outer shieldings. The central electric cable of each transmission line is in contact with the antenna element; however the outer shell of each transmission line is neither shown to connect to the antenna element or the ground plane. Unlike the present invention which uses a single transmission line having a central conductor of the single transmission line connecting to the antenna trace and the outer shell (ground conductor) of the single transmission line contacting both the ground plane and the antenna element, neither of the transmission lines in Wang show or describe a first signal conductor (central conductor) contacting the antenna trace and a second conductor (outer shell) contacting both the ground plane and the antenna element. This limitation is neither shown nor suggested by Wang.

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Referring to Fig. 2a of Wang even though not referenced by the office action in the rejection of claim 1, Wang describes (col. 5, lines 60-67) a first and second coaxial cable (36 and 37) extending through an opening in the ground plane for electrically coupling the antenna element with a feed source. The coax cables (36 and 37) include central shielded electric cables (42 and 43) which are respectively connected with the terminals (26 and 27 of the antenna element). The outer shieldings of the coaxial cables are electrically coupled to each other in the vicinity of the antenna element. Wang fails to show or suggest the second signal conductor (outer shell) of the same transmission line contacting both the antenna trace and ground plane. Both Wang and Johnson fail to show or suggest, either individually or in combination, the coupling of the second signal conductor of the transmission to both the ground plane and the antenna trace. Therefore, claim 1 is allowable.

Claim 2 recites the dielectric spacer mounted to the ground plane. Johnson describes a microstrip line separated from the ground plane by a dielectric. Johnson does not teach that the dielectric is mounted to the ground plane, rather the dielectric only separates the microstrip line from the ground plane. Since Johnson and Wang fail to teach mounting the dielectric spacer to the ground plane either individually or in combination. Therefore, claim 2 is allowable.

Claim 3 depends from claim 1 and incorporates all the limitations of claim 1 which are neither shown nor suggested by Johnson and Wang either independently or in combination. Therefore, claim 3 is allowable.

Claims 4 and 18 recite a feed point located at one of the first and second end regions (of the trace) and a second point located at the middle region (of the trace). Johnson (Fig. 2a) only shows a coupling to an end of the antenna element (trace). Coupling to a second point in the middle region of the trace is neither shown nor described in Johnson. Johnson and Wang fail to teach or suggest, either individually or in combination, the limitations of claims 4 and 18. Therefore, claims 4 and 18 are allowable.

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Claims 5-8 depend from claim 1 and incorporate all the limitations of claim 1 which are neither shown nor suggested by Johnson and Wang either independently or in combination. Therefore, claims 5-8 are allowable.

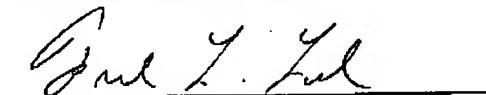
Claims 9 and 19 have been amended to include the limitation that the feed point and second point are spaced apart by a predetermined distance less than one quarter wavelength of the RF signal. Johnson and Wang fail to describe or suggest, either independently or in combination, the added limitation of claims 9 and 19. Therefore, claims 9 and 19 are allowable.

Claims 10-12 depend from claim 1 and incorporate all the limitations of claim 1 which are neither shown nor suggested by Johnson and Wang either independently or in combination. Therefore, claims 10-12 are allowable.

Claims 14-17 depend from claim 13 and incorporate all the limitations of claim 13 which are neither shown nor suggested by Johnson and Wang either independently or in combination. Therefore, claims 14-15, and 17 are allowable.

In view of the foregoing amendment and remarks, all pending claims are in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,



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